

Complete Summary

GUIDELINE TITLE

Diagnosis and management of epilepsies in children and young people.

BIBLIOGRAPHIC SOURCE(S)

Scottish Intercollegiate Guidelines Network (SIGN). Diagnosis and management of epilepsies in children and young people. Edinburgh (Scotland): Scottish Intercollegiate Guidelines Network (SIGN); 2005 Mar. 53 p. (SIGN publication; no. 81). [279 references]

GUIDELINE STATUS

This is the current release of the guideline.

Any amendments to the guideline in the interim period will be noted on [Scottish Intercollegiate Guidelines Network \(SIGN\) Web site](#).

COMPLETE SUMMARY CONTENT

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SCOPE

DISEASE/CONDITION(S)

- Epilepsy including:
 - Focal epileptic seizures
 - Generalised epileptic seizures
- Status epilepticus

Note: The guideline does not cover seizures in newborn babies, infants under one month of age, the management of non-epileptic seizures nor surgical or other specialised treatment for intractable seizures. Issues relating to contraception and reproduction have been covered in the adult guideline.

GUIDELINE CATEGORY

Diagnosis
Management
Treatment

CLINICAL SPECIALTY

Critical Care
Emergency Medicine
Family Practice
Internal Medicine
Medical Genetics
Neurology
Pediatrics
Psychiatry
Psychology

INTENDED USERS

Advanced Practice Nurses
Nurses
Patients
Pharmacists
Physicians
Psychologists/Non-physician Behavioral Health Clinicians
Public Health Departments
Social Workers

GUIDELINE OBJECTIVE(S)

To provide evidence-based guidelines on the diagnosis and management of the epilepsies of children and young people aged from one month to 19 years of age (remaining in secondary education)

TARGET POPULATION

Children and young people (aged one month to 19 years) with epilepsy or status epilepticus

INTERVENTIONS AND PRACTICES CONSIDERED

Diagnosis

1. Patient history, including what occurred before, during, and after the attack, as described by the child and first-hand witnesses
2. Electrocardiography (ECG)
3. Home video recording
4. Electroencephalography (EEG)
 - Standard EEG
 - Repeat EEG

- Sleep EEG
 - Ictal EEG
5. Magnetic resonance imaging (MRI)
 6. Genetic investigations, with referral to genetics services, if appropriate

Management

1. Provision of appropriate information to patients and their carers with subsequent documentation of discussions
2. Provision of information for families that is appropriate given the sociocultural context
3. Provision of information for schools
4. Risk management including educating patients with regard to safety in common situations and the risks of sudden unexpected death in epilepsy (SUDEP)
5. Routine antiepileptic drug (AED) level monitoring (considered, but not recommended)
6. Discussion of the management of potential adverse effects of AEDs
7. Referral to tertiary care when appropriate
8. Withdrawal of anti-epileptic drugs
9. Inclusion of paediatric epilepsy nurse specialists on management teams

Treatment

1. AED monotherapy
2. Combination therapy of AEDs
3. Corticotropin or corticosteroids for West's syndrome
4. Nasal or buccal midazolam or rectal diazepam for prolonged or serial seizures
5. Co-administration of medications for comorbidities

MAJOR OUTCOMES CONSIDERED

- Sensitivity and specificity of diagnostic tests
- Remission rate
- Seizure frequency and severity
- Adverse events
- Quality of life
- Mortality

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

The evidence base for this guideline was synthesised in accordance with Scottish Intercollegiate Guidelines Network (SIGN) methodology. A systematic review of the literature was carried out using an explicit search strategy devised by a SIGN Information Officer. Databases searched include Medline, Embase, CINAHL,

PsychINFO, and the Cochrane Library. The year range covered was 1980 to 2003. Internet searches were carried out on various Web sites including the New Zealand Guidelines Programme, NELH Guidelines Finder, and the US National Guidelines Clearinghouse. The Medline version of the main search strategies can be found on the SIGN Web site, in the section covering supplementary guideline material. The main searches were supplemented by material identified by individual members of the development group. All selected papers were evaluated by a minimum of two members of the group using standard SIGN methodological checklists before conclusions were considered as evidence.

NUMBER OF SOURCE DOCUMENTS

Not stated

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Weighting According to a Rating Scheme (Scheme Given)

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Levels of Evidence

1++: High quality meta-analyses, systematic reviews of randomised controlled trials (RCTs), or RCTs with a very low risk of bias

1+: Well-conducted meta-analyses, systematic reviews of RCTs, or RCTs with a low risk of bias

1-: Meta-analyses, systematic reviews of RCTs, or RCTs with a high risk of bias

2++: High quality systematic reviews of case control or cohort studies
High quality case control or cohort studies with a very low risk of confounding or bias and a high probability that the relationship is causal

2+: Well-conducted case control or cohort studies with a low risk of confounding or bias and a moderate probability that the relationship is causal

2-: Case control or cohort studies with a high risk of confounding or bias and a significant risk that the relationship is not causal

3: Non-analytic studies (e.g. case reports, case series)

4: Expert opinion

METHODS USED TO ANALYZE THE EVIDENCE

Systematic Review

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

The Scottish Intercollegiate Guidelines Network (SIGN) carries out comprehensive systematic reviews of the literature using customized search strategies applied to a number of electronic databases and the Internet. This is often an iterative process whereby the guideline development group will carry out a search for existing guidelines and systematic reviews in the first instance and, after the results of this search have been evaluated, the questions driving the search may be redefined and focused before proceeding to identify lower levels of evidence.

Once papers have been selected as potential sources of evidence, the methodology used in each study is assessed to ensure its validity. SIGN has developed checklists to aid guideline developers to critically evaluate the methodology of different types of study design. The result of this assessment will affect the level of evidence allocated to the paper, which in turn will influence the grade of recommendation it supports

Additional details can be found in the companion document titled "SIGN 50: A Guideline Developers' Handbook." (Edinburgh [UK]: Scottish Intercollegiate Guidelines Network. [SIGN publication; no. 50]), available from the [SIGN Web site](#).

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus

DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

The process for synthesizing the evidence base to form graded guideline recommendations is illustrated in the companion document titled "SIGN 50: A Guideline Developers' Handbook." (Edinburgh [UK]: Scottish Intercollegiate Guidelines Network. [SIGN publication; no. 50]), available from the [SIGN Web site](#).

Evidence tables should be compiled, summarizing all the validated studies identified from the systematic literature review relating to each key question. These evidence tables form an important part of the guideline development record and ensure that the basis of the guideline development group's recommendations is transparent.

In order to address how the guideline developer was able to arrive at their recommendations given the evidence they had to base them on, SIGN has introduced the concept of considered judgment.

Under the heading of considered judgment, guideline development groups are expected to summarise their view of the total body of evidence covered by each evidence table. This summary view is expected to cover the following aspects:

- Quantity, quality, and consistency of evidence
- Generalisability of study findings
- Applicability to the target population of the guideline
- Clinical impact (i.e., the extent of the impact on the target patient population, and the resources need to treat them.)

Guideline development groups are provided with a pro forma in which to record the main points from their considered judgment. Once they have considered these issues, the group are asked to summarise their view of the evidence and assign a level of evidence to it, before going on to derive a graded recommendation.

The assignment of a level of evidence should involve all those on a particular guideline development group or subgroup involved with reviewing the evidence in relation to each specific question. The allocation of the associated grade of recommendation should involve participation of all members of the guideline development group. Where the guideline development group is unable to agree a unanimous recommendation, the difference of opinion should be formally recorded and the reason for dissent noted.

The recommendation grading system is intended to place greater weight on the quality of the evidence supporting each recommendation, and to emphasise that the body of evidence should be considered as a whole, and not rely on a single study to support each recommendation. It is also intended to allow more weight to be given to recommendations supported by good quality observational studies where randomised controlled trials (RCTs) are not available for practical or ethical reasons. Through the considered judgment process guideline developers are also able to downgrade a recommendation where they think the evidence is not generalisable, not directly applicable to the target population, or for other reasons is perceived as being weaker than a simple evaluation of the methodology would suggest.

On occasion, there is an important practical point that the guideline developer may wish to emphasise but for which there is not, nor is there likely to be, any research evidence. This will typically be where some aspect of treatment is regarded as such sound clinical practice that nobody is likely to question it. These are marked in the guideline as "good practice points." It must be emphasized that these are not an alternative to evidence-based recommendations, and should only be used where there is no alternative means of highlighting the issue.

SIGN AND NICE

The National Institute for Health and Clinical Excellence (NICE) technology appraisal 79, Newer Drugs for Epilepsy in Children, approved for use in Scotland in 2004, gave guidance on the use of licensed medications for epilepsy in children. Recommendations in sections 5 and 6 of this SIGN guideline, which considers both licensed and unlicensed medications, may therefore differ from those given in the NICE appraisal.

In July 2001 the Department of Health and National Assembly for Wales instructed NICE to develop a clinical guideline on epilepsy. This work was allocated to the National Collaborating Centre for Primary Care (NCC-PC). Concurrently, SIGN were working on the development of two epilepsy guidelines: SIGN 70, Diagnosis and Management of Adults with Epilepsy (published in April 2003) and this guideline, SIGN 81, Diagnosis and Management of Epilepsies in Children and Young People (published in March 2005). Members of the two SIGN guideline development groups, the NICE guideline development group and representatives of both SIGN Executive and the NCC-PC met frequently throughout the development phases of the respective guidelines in order to ensure that the

publications would complement rather than conflict with each other. The results of the evidence reviews completed by each team were shared, but the formulation of recommendations for each guideline remained separate.

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

The grade of recommendation relates to the strength of the evidence on which the recommendation is based. It does not reflect the clinical importance of the recommendation.

Grade A: At least one meta-analysis, systematic review of randomized controlled trials (RCTs), or randomized controlled trial rated as 1++ and directly applicable to the target population; or

A body of evidence consisting principally of studies rated as 1+, directly applicable to the target population, and demonstrating overall consistency of results

Grade B: A body of evidence including studies rated as 2++, directly applicable to the target population, and demonstrating overall consistency of results; or

Extrapolated evidence from studies rated as 1++ or 1+

Grade C: A body of evidence including studies rated as 2+, directly applicable to the target population and demonstrating overall consistency of results; or

Extrapolated evidence from studies rate as 2++

Grade D: Evidence level 3 or 4; or

Extrapolated evidence from studies rated as 2+

COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

METHOD OF GUIDELINE VALIDATION

External Peer Review
Internal Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

A national open meeting is the main consultative phase of Scottish Intercollegiate Guidelines Network (SIGN) guideline development, at which the guideline development group presents its draft recommendations for the first time. The national open meeting for this guideline was held on 9 October 2003 and was attended by around 180 representatives of all the key specialties relevant to the guideline. The draft guideline was also available on the SIGN website for a limited

period at this stage to allow those unable to attend the meeting to contribute to the development of the guideline.

This guideline was also reviewed in draft form by independent expert referees, who were asked to comment primarily on the comprehensiveness and accuracy of interpretation of the evidence base supporting the recommendations in the guideline.

As a final quality control check, the guideline was reviewed by an editorial group comprising the relevant specialty representatives on SIGN Council to ensure that the specialist reviewers' comments have been addressed adequately and that any risk of bias in the guideline development process as a whole has been minimised.

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

Note from SIGN and NGC: In addition to these evidence-based recommendations, the guideline development group also identifies points of best clinical practice in the full-text guideline document.

The grades of recommendations (A-D) and levels of evidence (1++, 1+, 1-, 2++, 2+, 2-, 3, 4) are defined at the end of the "Major Recommendations" field.

Diagnosis

Who Should Make the Diagnosis?

D: The diagnosis of epilepsy should be made by a paediatric neurologist or paediatrician with expertise in childhood epilepsy.

History Taking and Clinical Features

D: An accurate history of the event should be taken from first-hand witnesses and the child.

Investigative Procedures

Electroencephalography (EEG)

D: An EEG should only be requested after careful clinical evaluation by someone with expertise in childhood epilepsy.

Standard EEG

C: All children with recurrent epileptic seizures should have an EEG. An early recording may avoid the need for repeated EEG investigations.

Repeat EEG Recordings and Sleep EEG

D: For children with recurrent epileptic seizures and a normal standard EEG, a second EEG recording including sleep should be used to aid identification of a specific epilepsy syndrome.

Ictal EEG Recording

D: Where the clinical diagnosis of epilepsy is uncertain and if events are sufficiently frequent, an ictal EEG should be used to make a diagnosis of an epileptic or non-epileptic seizure.

Brain Imaging

D: Most children with epilepsy should have an elective magnetic resonance imaging (MRI) brain scan. Children with the following epilepsy syndromes (which are following a typical course) do not need brain imaging:

- Idiopathic (primary) generalised epilepsies (e.g., childhood absence epilepsy, juvenile myoclonic epilepsy, or juvenile absence epilepsy)
- Benign childhood epilepsy with centrotemporal spikes (benign rolandic epilepsy)

Management

Information for Discussion with Children, Young People and Their Carers

D: All children with epilepsy and their carers should be given information appropriate to their condition. A summary of the contents of these discussions should be recorded.

D: Families should be given information to take home in the most suitable format, making adjustments for different sociocultural contexts (e.g., leaflets, fact sheets, videos).

Management of Risk

Safety

D: Children with epilepsy should be encouraged to participate in normal activities with their peers. Supervision requirements should be individualised taking into account the type of activity and the seizure history.

Death in Epilepsy

D: Families should be advised if the child has an increased risk of sudden unexpected death in epilepsy (SUDEP). They can be reassured if the risk is considered to be low.

Antiepileptic Drug Treatment

When to Start Antiepileptic Drug Treatment

Febrile Seizures

B: Children with febrile seizures, even if recurrent, should not be treated prophylactically with antiepileptic drugs.

Provoked Seizures

A: Long term prophylactic antiepileptic drug treatment for children with head injuries is not indicated.

Unprovoked, Tonic-Clonic Epileptic Seizures

A: Antiepileptic drug treatment should not be commenced routinely after a first, unprovoked tonic-clonic seizure.

Choice of First Antiepileptic Drug (AED)

Generalised Epilepsies

C: The choice of first AED should be determined where possible by the syndromic diagnosis and potential adverse effects.

West's Syndrome and Epileptic Infantile Spasms

B: In West's syndrome, corticotropin or corticosteroids should be used as first line treatment. Where West's syndrome is caused by tuberous sclerosis, vigabatrin is superior.

Antiepileptic Drug Combination Therapy

Focal Seizures

A: When appropriate monotherapy fails to reduce seizure frequency, combination therapy should be considered.

Adverse Effects of Antiepileptic Drugs

Monitoring for Adverse Effects in Antiepileptic Drugs

B: Routine AED level monitoring is not indicated in children.

Withdrawal of Antiepileptic Drugs

A: Withdrawal of antiepileptic drug treatment should be considered in children who have been seizure free for two or more years.

Management of Prolonged or Serial Seizures and Convulsive Status Epilepticus

Prolonged or Serial Seizures

B: Prolonged or serial seizures should be treated with either nasal or buccal midazolam or rectal diazepam.

Behaviour and Learning

Epilepsy and the Use of Other Medications

Neurostimulants

D: Neurostimulant treatment should not be withheld, when indicated, from children with epilepsy and attention deficit hyperactivity disorder (ADHD).

Melatonin

D: Epilepsy, or a history of seizures, are not contraindications to the use of melatonin for the treatment of sleep disorders in children and young people.

Models of Care

Role of Epilepsy Nurse Specialists

D: Each epilepsy team should include paediatric epilepsy nurse specialists.

Definitions:

Grades of Recommendations

Grade A: At least one meta-analysis, systematic review of randomized controlled trials (RCTs), or RCT rated as 1++ and directly applicable to the target population; or

A body of evidence consisting principally of studies rated as 1+, directly applicable to the target population, and demonstrating overall consistency of results

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Extrapolated evidence from studies rate as 2++

Grade D: Evidence level 3 or 4; or

Extrapolated evidence from studies rated as 2+

Levels of Evidence

1++: High quality meta-analyses, systematic reviews of RCTs, or RCTs with a very low risk of bias

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3: Non-analytic studies (e.g. case reports, case series)

4: Expert opinion

CLINICAL ALGORITHM(S)

An algorithm is provided in the original guideline document for treatment of an acute tonic-clonic convulsion in a hospital setting including established convulsive status epilepticus.

EVIDENCE SUPPORTING THE RECOMMENDATIONS

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The type of supporting evidence is identified and graded for each recommendation (see "Major Recommendations").

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

- Appropriate diagnosis, management, and treatment of children and young people with epilepsy
- A standard electroencephalogram (EEG) is often a valuable tool in children with epileptic seizures. It contributes to:
 - Identification of features of a focal or of a generalised epilepsy
 - Syndromic diagnosis
 - Choice of further investigation
 - The therapeutic management of epilepsy
 - Prognosis of epilepsy

POTENTIAL HARMS

Antiepileptic Drugs (AEDs) Which May WORSEN Specific Syndromes or Seizures

- Carbamazepine, vigabatrin, tiagabine, and phenytoin may worsen childhood absence epilepsy, juvenile absence epilepsy, and juvenile myoclonic epilepsy.
- Vigabatrin may worsen absences and absence status.
- Clonazepam may worsen generalised tonic-status in Lennox-Gastaut Syndrome.
- Lamotrigine may worsen Dravet's syndrome and juvenile myoclonic epilepsy.

Adverse Effects of AEDs

- Adverse effects from AEDs are common and are a major cause of discontinuing drug treatment. Many adverse effects are dose related and predictable. These can be minimized by gradual escalation of the dose and dose reduction should symptoms persist.
- Idiosyncratic drug reactions usually arise early in treatment but can occur at any time and are potentially serious. Rash is a common adverse effect in children and is associated with carbamazepine, phenytoin, and lamotrigine. Rarely, a severe hypersensitivity syndrome may occur which may be life threatening.
- Sodium valproate is associated with significant weight gain in children and adolescents. Being overweight at the start of treatment may be a significant predictor of further weight gain with this drug.
- Parents frequently report cognitive adverse effects of AEDs in their children. The few well controlled studies do not demonstrate significant cognitive impairment with clobazam, sodium valproate, carbamazepine, or phenytoin. Phenobarbital may have an adverse effect on cognitive function in children.
- For adults treated with vigabatrin, visual field impairment is relatively common and may be irreversible. Few data exist in children. The risk of visual field defects must be balanced against the benefits of treating West's syndrome or symptomatic focal epilepsies.
- Gum enlargement or overgrowth is frequently associated with phenytoin and rarely with sodium valproate and vigabatrin. This can prevent the maintenance of good oral hygiene and lead to bleeding, tenderness, dental decay, periodontal disease and infection. Overgrowth can be reduced by meticulous daily oral hygiene, but this may be difficult in some children, particularly in those with physical and learning difficulties.

Teratogenic Side Effects

- The overall risk of major fetal malformation is approximately 2% in any pregnancy. This increases 2- to 3-fold in women taking a single AED. Data suggest that the risk with sodium valproate may be higher than with lamotrigine or carbamazepine.
- Two retrospective epidemiological studies have also suggested an association between in utero exposure to sodium valproate and risk of developmental delay.

QUALIFYING STATEMENTS

QUALIFYING STATEMENTS

This guideline is not intended to be construed or to serve as a standard of care. Standards of care are determined on the basis of all clinical data available for an individual case and are subject to change as scientific knowledge and technology advance and patterns of care evolve. Adherence to guideline recommendations will not ensure a successful outcome in every case, nor should they be construed as including all proper methods of care or excluding other acceptable methods of care aimed at the same results. The ultimate judgment must be made by the appropriate healthcare professional(s) responsible for clinical decisions regarding a particular clinical procedure or treatment plan. This judgment should only be arrived at following discussion of the options with the patient, covering the diagnostic and treatment choices available. However, it is advised that significant departures from the national guideline or any local guidelines derived from it should be fully documented in the patient's case notes at the time the relevant decision is taken.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

Implementation of national clinical guidelines is the responsibility of each National Health Service (NHS) Board and is an essential part of clinical governance. It is acknowledged that every Board cannot implement every guideline immediately on publication, but mechanisms should be in place to ensure that the care provided is reviewed against the guideline recommendations and the reasons for any differences assessed and, where appropriate, addressed. These discussions should involve both clinical staff and management. Local arrangements may then be made to implement the national guideline in individual hospitals, units and practices, and to monitor compliance. This may be done by a variety of means including patient-specific reminders, continuing education and training, and clinical audit.

Key points for audit are identified in the original guideline document.

IMPLEMENTATION TOOLS

Audit Criteria/Indicators
Clinical Algorithm
Quick Reference Guides/Physician Guides

For information about [availability](#), see the "Availability of Companion Documents" and "Patient Resources" fields below.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Living with Illness

IOM DOMAIN

Effectiveness
Patient-centeredness

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

Scottish Intercollegiate Guidelines Network (SIGN). Diagnosis and management of epilepsies in children and young people. Edinburgh (Scotland): Scottish Intercollegiate Guidelines Network (SIGN); 2005 Mar. 53 p. (SIGN publication; no. 81). [279 references]

ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

2005 Mar

GUIDELINE DEVELOPER(S)

Scottish Intercollegiate Guidelines Network - National Government Agency [Non-U.S.]

SOURCE(S) OF FUNDING

Scottish Executive Health Department

GUIDELINE COMMITTEE

Not stated

COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

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FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

All members of the guideline development group made declarations of interest and further details of these are available on request from the Scottish Intercollegiate Guidelines Network (SIGN) Executive.

GUIDELINE STATUS

This is the current release of the guideline.

Any amendments to the guideline in the interim period will be noted on [Scottish Intercollegiate Guidelines Network \(SIGN\) Web site](#).

GUIDELINE AVAILABILITY

Electronic copies: Available in Portable Document Format (PDF) from the [Scottish Intercollegiate Guidelines Network \(SIGN\) Web site](#).

AVAILABILITY OF COMPANION DOCUMENTS

The following are available:

- Quick reference guide: Diagnosis and management of epilepsies in children and young people. Edinburgh (Scotland): Scottish Intercollegiate Guidelines Network, 2005 Mar. 2 p. Available in Portable Document Format (PDF) from the [Scottish Intercollegiate Guidelines Network \(SIGN\) Web site](#).
- SIGN 50: A guideline developer's handbook. Edinburgh (Scotland): Scottish Intercollegiate Guidelines Network. (SIGN publication; no. 50). Available from the [SIGN Web site](#).
- Appraising the quality of clinical guidelines. The SIGN guide to the AGREE (Appraisal of Guidelines Research & Evaluation) guideline appraisal instrument. Edinburgh (Scotland): Scottish Intercollegiate Guidelines Network, 2001. Available from the [SIGN Web site](#).

PATIENT RESOURCES

None available

NGC STATUS

This summary was completed by ECRI on May 23, 2005. The information was verified by the guideline developer on May 27, 2005.

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